CLAIMS:

1. An isolated nucleic acid sequence selected from the group consisting of:

(i) the nucleic acid sequence depicted in any one of SEQ ID NO: 1 to SEQ ID NO:6.

(ii) nucleic acid sequences having at least 70% identity with the sequence of (i); and

(iii) fragments of (i) or (ii) of at least 20 b.p provided that said fragment contains a sequence which is not present in the original sequence of PSA from which the sequences of (i) have been varied by alternative splicing.

2. A nucleic acid sequence according to Claim 1(ii) wherein the nucleic acid sequences have at least 80% identity with the sequence of Claim 1(i).

3. A nucleic acid sequence according to Claim 2, wherein the nucleic acid sequences have at least 90% identity.

4. An isolated nucleic acid sequence complementary to the nucleic acid sequence of Claim 1.

5. An amino acid sequence selected from the group consisting of:

(i) an amino acid sequence coded by the isolated nucleic acid sequence of Claim 1;

(ii) fragments of the amino acid sequence of (i) having at least 10 amino acids;

(iii) analogues of the amino acid sequences of (i) or (ii) in which one or more amino acids has been added, deleted, replaced or chemically modified without substantially altering the biological activity of the parent amino acid sequence.

6. An amino acid sequence according to Claim 5, as depicted in any one of SEQ ID NO:7 to SEQ ID NO:12.

7. An isolated nucleic acid sequence coding for the amino acid sequence of Claim 5 or 6.

8. A purified antibody which binds specifically to the amino acid sequence of Claim 5 or 6.

9. A purified antibody which binds to an amino acid sequence present in any one of the amino acid sequence of Claim 5 or 6 and which is not present in the original PSA sequence.

10. A purified antibody according to Claim 8 or 9, conjugated to a cytotoxic compound.

11. An expression vector comprising the nucleic acid sequences of Claim 1 or 7 and control elements for the expression of the nucleic acid sequence in a suitable host.

12. An expression vector comprising the nucleic acid sequence of Claim 4, and control elements for the expression of the nucleic acid sequence in a suitable host.

13. A host cell transfected by the expression vector of Claim 11 or 12.

14. A pharmaceutical composition comprising a pharmaceutically acceptable carrier and as an active ingredient an agent selected from the group consisting of:

(i) the expression vector of Claim 11; and

(ii) the amino acid sequence of Claim 5 or 6.

15. A pharmaceutical composition according to Claim 14, for treatment of diseases which can be ameliorated or cured by raising the level of the prostate specific antigen like (PSA variant) product.

16. A pharmaceutical composition comprising a pharmaceutically acceptable carrier and as an active ingredient an agent selected from the group consisting of:

(i) the nucleic acid sequence of Claim 4;

(ii) the expression vector of Claim 12; and

(iii) the purified antibody of Claim 8 or 9.

17. A pharmaceutical composition according to Claim 16, for treatment of diseases which can be ameliorated or cured by decreasing the level of the PSA variant product.

18. A pharmaceutical composition for selective destruction of cells expressing membrane-bond PSA variant product comprising a pharmaceutically acceptable carrier and as an active ingredient an antibody of Claim 10.

19. A method for detecting an PSA variant nucleic acid sequence in a biological sample, comprising the steps of:

(a) hybridizing to nucleic acid material of said biological sample a nucleic acid sequence of Claim 1 or 4; and

(b) detecting hybridization complexs;

wherein the presence of said hybridization complex correlates with the presence of an PSA variant nucleic acid sequence in the said biological sample.

20. A method for determining the level of nucleic acid sequences of PSA variants in a biological sample comprising the steps of:

(a) hybridizing to nucleic acid material of said biological sample any one of the nucleic acid sequences of claim 1 or 4; and

(b) determining the amount of hybridization complexes and normalizing said amount to provide the level of the PSA variant nucleic acid sequences in the sample.

21. A method for determining the ratio between the level of the nucleic acid sequence of a PSA variant in a first biological sample and the level of the original PSA sequence from which the variant has been varied by alternative splicing, in a second biological sample comprising:

(a) determining the level of the PSA variant nucleic acid sequence in the first biological sample according to the method of Claim 20;

(b) determining the level of the PSA original sequence in the second biological sample ; and

(c) comprising the levels obtained in (a) and (b) to give said ratio.

22. A method according to Claim 21, wherein said first and said second biological samples are the same sample.

23. A method according to Claim 19 to 22, wherein the nucleic acid material of said biological sample are mRNA transcripts.

24. A method according to Claim 19 to 23, where the nucleic acid sequence is present in a nucleic acid chip.

25. A method according to any of Claims 19 to 24 for detection of the presence of prostate cancer, detection of predisposition to prostate cancer or evaluation of the malignancy of prostate cancer.

26. A method for identifying candidate compounds capable of binding to the PSA variant product and modulating its activity the method comprising:

(i) providing a protein or polypeptide comprising an amino acid sequence substantially as depicted in any one of SEQ ID NO: 7 to SEQ ID NO: 12, or a fragment of such a sequence;

(ii) contacting a candidate compound with said amino acid sequence;

(iii) determining the effect of said candidate compound on the biological activity of said protein or polypeptide and selecting those compounds which show a significant effect on said biological activity.

27. A method according to Claim 26, wherein the compound is an activator and the measured effect is increase in the biological activity.

28. A method according to Claim 26, wherein the compound is an deactivator and the effect is decrease in the biological activity.

29. An activator of the amino acid sequence of Claim 5 or 6.

30. An deactivator of the amino acid sequence of Claims 5 or 6.

31. A method for detecting PSA variant-product in a biological sample, comprising the steps of:

(a) contacting with said biological sample the antibody of Claim 8 or 9, thereby forming an antibody-antigen complex; and

(b) detecting said antibody-antigen complex

wherein the presence of said antibody-antigen complex correlates with the presence of PSA variant product in said biological sample.

32. A method for determining the level of amino acid sequences of PSA variants according to claim 5 or 6 in a biological sample comprising the steps of:

(a) contacting with said biological sample the antibody of Claim 8 or 9, thereby forming an antibody-antigen complex; and

(b) detecting said the amount of said antibody-antigen complex and normalizing said amount to provide the level of the amino acid sequence in the sample.

33. A method for determining the ratio between the level of any one of the amino acid sequences of claims 5 or 6 of the PSA variant present in a first biological sample and the level of the original PSA sequence from which the variant has been varied by alternative splicing, in a second biological sample comprising:

(a) determining the level of the PSA variant amino acid sequence in the first biological sample according to the method of Claim 32;

(b) determining the level of the PSA original sequence in the second biological sample ; and

(c) comparing the levels obtained in (a) and (b) to give said ratio.

34. A method according to Claim 33, wherein said first and said second biological samples are the same sample.

35. A method according to any one of Claims 31 to 34 for detecting the presence of prostate cancer or detecting pre-disposition to prostate cancer, or for detection of the malignancy of prostate cancer.